COMPOUND

LUXATION OF THE ANKLE-JOINT.

ILLUSTRATED BY CASES WITH SPECIAL REFERENCE TO THE PRESERVATIVE SURGERY OF THE FOOT.

BY

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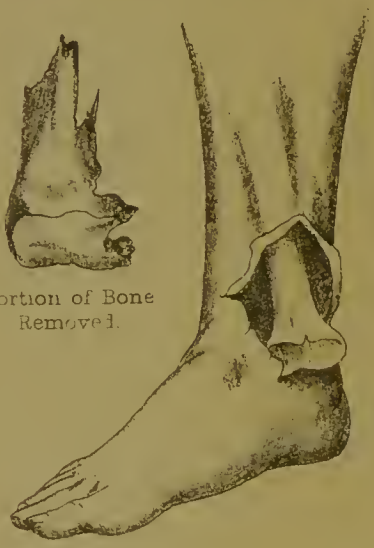
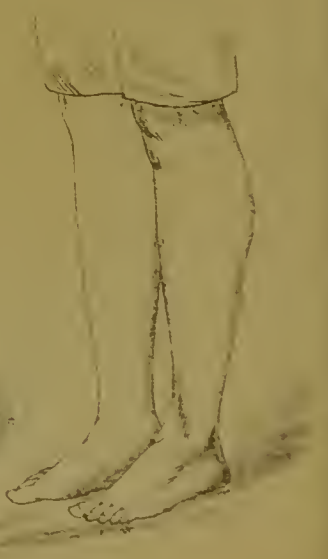
Reprinted from the Transactions of the Royal Academy of Medicine in Ireland.

DUBLIN:
PRINTED FOR THE AUTHOR
BY JOHN FALCONER, 53 UPPER SACKVILLE-STREET.

1891.

Case II.





Case III

MR. CROLY ON COMPOUND LUXATION OF THE ANKLE-JOINT

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COMPOUND LUXATION OF THE ANKLE-JOINT.

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THREE cases of compound luxation of the ankle-joint—one of the tibia and fibula forwards, one of the tibia inwards, and a third of both bones outwards—having occurred in my hospital and private practice (two of the cases quite recently), I wish to place them on record by communicating them to the Royal Academy of Medicine, chiefly with reference to the preservative surgery of the foot, that important question, in my opinion, not being sufficiently settled, and the subject of my communication not having been discussed by the Surgical Society in Ireland. In such a Society as this, the Surgical Section of our Academy, made up chiefly of hospital surgeons and practical anatomists, it would be superfluous to enter with any minuteness into the anatomy of the joint of the ankle; but as we have amongst us some practitioners who have not the constant opportunities some possess of keeping up their anatomy, and in order to further elucidate the subject of injuries to the joint of the ankle, I shall briefly introduce my cases with a few practical remarks on the surgical anatomy of the ankle-joint.

The joint of the ankle is described as a perfect angular ginglymus; the bones are beautifully adapted, and compared to a tenon and mortise joint, from the closeness of their fitting. Three bones contribute to the formation of the ankle-joint—viz., tibia and fibula, which by their union form a deep depression, into which the upper surface of the astragalus fits. The tibia as it approaches the ankle-joint loses its prismatic shape, and assumes a well-defined cubical or quadrangular form. On the lower surface of the tibia is a quadrilateral articulating cavity covered with cartilage; on the

[a] Read in the Section of Surgery, Royal Academy of Medicine.

external surface of the tibia is a depression for the fibula, and the inner side is prolonged downwards for nearly an inch, and forms the malleolus internus.

The fibula as it approaches the ankle-joint becomes suddenly enlarged, and forms the malleolus externus.

The astragalus enters into the formation of the ankle-joint by its superior surface and a portion of its lateral surfaces. The articulating surface for the tibia is of an oblong quadrilateral form, and measures an inch and a half antero-posteriorly, and about an inch and a quarter transversely; the measurement is greater in front than behind (an arrangement which guards against dislocation of the tibia forwards and of the foot backwards). The mortise cavity is formed by the lower end of the tibia, and is completed by the fibula. The powerful ligamentous connection between the tibia and fibula makes the mortise very strong.

The *ligaments* are five in number:—

(1.) The *internal tibio-tarsal*, internal lateral, called the deltoid by Weitbrecht.

(2.) *Anterior tibio-tarsal* of Cloquet, very loose.

(3.) *Anterior fibulo-tarsal*, ligamentum fibulæ anterius of Weitbrecht, anterior external lateral of Boyer.

(4.) The *middle fibulo-tarsal*, ligamentum fibulæ medium perpendiculare of Weitbrecht, external lateral of Cloquet.

(5.) *Posterior fibulo-tarsal ligament*, ligamentum fibulæ posterius (Weitbrecht), posterior external lateral of Boyer, also called the oblique ligament of Weitbrecht (strongest).

The *synovial membrane* of the ankle-joint is of very great extent: it is very loose upon the anterior and posterior surfaces of the joint, and is said to contain a greater amount of synovia than any joint in the body.

The *leg and foot* meet at a right angle in the ankle-joint; the fibula plays no part when the joint is at rest; the tibia alone receives the weight of the body and transmits it to the astragalus.

The *motions of flexion and extension* are the only ones permitted at the ankle-joint. In *flexion* the astragalus rolls from before backwards in the tibio-tarsal mortise; in flexion the foot and leg

can form an angle of about 60° at this point; by the formation of the joint further flexion is prevented.

In *extension* the foot can be made to form an obtuse angle of about 150°; motions called abduction and adduction are not movements in the ankle-joint, but take place in the joints of the tarsus.

Winslow, who has given the most perfect description of the different motions of the foot, affirms that flexion and extension are the only movements permitted in the ankle-joint. Flexion and extension are the visible movements of the tibio-astragaloid joint.

The *tibia and fibula* form together a cavity which receives the pulley-like surface of the astragalus, and thus presents one of the purest hinge-joints of the human body.

Lateral motion is prevented.

The *buttresses* formed by the malleoli guard against luxations.

The *external malleolus* projects lower and more posteriorly than the internal, and in this way gives considerable strength to the joint by "wedging" the astragalus.

When we reflect on the great strength of the ligaments which connect the astragalus with the tibia and fibula, and the great support which the articulation derives from the prolongation downwards of the malleoli, we can easily perceive that a complete luxation of the ankle-joint can only be produced by great violence. Rupture of the ligaments, fracture of the malleoli, and protrusion of the bones of the leg render such accidents very complex.

Notwithstanding, however, the perfect construction of the ankle-joint, the numerous ligaments which bind the bones together, the strong tendons, their sheaths, and the different layers of fascia which greatly contribute to the solidity of the joint, violent accidents set all these precautions of nature at defiance, and produce the most painful and formidable displacements. Hancock says of the human foot, "In the whole range of mechanics, architecture, or engineering where can we meet with such a structure as this?" And referring to the study of the anatomy of the human foot, the same distinguished surgeon and anatomist says, "That which was the student's former bane becomes his present delight, until at length, from contemplating the comprehensiveness of the design,

the ingenuity and at the same time the simplicity, the wondrous adaptation of the several parts to their several functions, and withal the perfection and completeness of each individual part in itself, he cannot but feel the great responsibility which he undertakes in practising the surgery of the foot, and the impropriety, I am almost tempted to say the sin, of unduly sacrificing any portion thereof."

Nature has made ample provision for guarding against complete luxations of this joint—*firstly*, by the shape of the end of the tibia and the upper surface of the astragalus; *secondly*, by the malleoli grasping the astragalus; and, *thirdly*, by the attachments of the powerful ligaments supported by the numerous tendons, which in themselves act as ligaments. I have frequently endeavoured, when demonstrating the joint of the ankle in the dissecting-room attached to this College, to forcibly separate the bones of the leg from the foot, and the astragalus from the os calcis, in order to impress upon my pupils the enormous violence which must occur in order to produce complete luxation.

Case I.—*Compound Luxation of Ankle-joint, Tibia, and Fibula forwards.*—Mr. James Prosser, a farmer, residing at Tibradden, Co. Dublin, aged about thirty years, was sitting on a mowing machine in the month of August, 1872. The horse ran away, and Mr. Prosser's right foot got entangled in the machine, causing a compound luxation of the ankle-joint. The patient was seen shortly afterwards by my father, Henry Croly, M.D., J.P., Rathfarnham, who telegraphed for me to come prepared to amputate a foot. I drove as quickly as possible to the patient's house, and on examination I observed the tibia and fibula protruding through the soft parts of the front of the right ankle; some of the tendons were lacerated, others stretched across the protruded bones (*vide* Fig. I.). There was not much hæmorrhage. On consultation we decided against amputation, the patient being a fine strong countryman and of temperate habits. An anæsthetic having being administered, and the joint and protruded bones washed with a solution of carbolic acid, the dislocation was reduced, and the limb placed in suitable splints. Subsequently the limb became enormously swollen, and there was much tension of the soft parts, necessitating numerous free incisions to relieve tension. The daily treatment of this case was carried out by my father, and I saw the patient occasionally with him, and we had the gratification of seeing our patient make

a splendid recovery, with a useful foot. I have seen Mr. Prosser recently and examined his foot; he walks as well as ever, and follows his usual occupation as a farmer. The joint of the *ankle* is stiff, but there is compensatory motion in the medico-tarsal joint (*vide* Photo., Fig. I.).

I had the following letter from Mr. Prosser in March, 1889:—

"Tibradden, *March* 21*st*, 1889.

"Dear Surgeon Croly,—As you may remember, about seventeen years ago I met with a very sad accident, a compound dislocation of the ankle, which you came out to amputate, and afterwards yourself and your father saved, and now it is just as good and useful a leg as the other, I can walk and do my work the same as ever, with the exception of a stiff joint.—I remain your sincere friend, "James Prosser."

Case II.—William Nolan, a coal porter of intemperate habits, aged forty-eight years, residing at No. 2 Peterson's-lane, was admitted into the City of Dublin Hospital on the evening of the 29th of May, 1888, suffering from compound dislocation of the right ankle-joint. This accident occurred also at Rathfarnham, and the man gave the following account of the occurrence:—He was going up a short, steep hill, with his coal-car heavily laden, leading his horse by the head. The horse fell, bringing Nolan to the ground; his foot got caught between the horse's shoulder and the shaft, and as the horse endeavoured to get up Nolan's foot was forcibly wrenched outwards. He was seen very soon by my father, who sent him at once to the hospital to be admitted under my care. On examination of the injured limb, I observed the tibia projecting through the soft parts for about 3 inches; the foot was much everted, and the fibula comminuted; there was not much hæmorrhage; the tip of the inner malleolus was detached; the astragalus was not injured (*vide* Fig. II.). Ether having been administered by Mr. Jackson, house surgeon, the dislocation was reduced, the leg having previously been flexed on thigh, and thigh on abdomen; a large drainage-tube was inserted, and the limb placed in suitable splints and dressed antiseptically. Opiates, with bromides, were administered to soothe the nervous system. The following day the tension of the limb was very great up to the knee, necessitating numerous free incisions. Subsequently six small fragments of fibula came away through opening on fibular side. November 26th following, I removed 2 inches of the end of the tibia, which became detached. The patient has walked to hospital lately, and has now, January, 1891, a very useful foot.

Case III.—Thomas Smith, of Williamstown, aged twenty-eight years, of very temperate habits, was admitted into the City of Dublin Hospital on Sunday morning, 4 o'clock, 8th July, 1888, suffering from compound luxation of the left ankle-joint. This case is very like No. 19 of Sir A. Cooper. He gave the following account of the accident:—He went to Merrion Farm, and was lying on a bench of straw, covered by an iron roof, intending to sleep there, so as to do some extra early work in the morning. A bundle of the straw which he was on gave way, and he fell to the ground, a distance of 20 feet. He was stunned by the fall, and on recovering his consciousness he tried to walk, but found he could not do so, and saw the bones protruding through his boot. He was conveyed at once to the City of Dublin Hospital, where I was summoned by telephone at 4 a.m., and on arriving there I observed the tibia and fibula protruding more than 3 inches through a small opening in the soft parts at the outside of the joint. There was no fracture of the bones; the inner edge of the foot was turned upwards, almost touching the inside calf of the leg (*see* Fig. III.). There was very little hæmorrhage. The patient having been placed under the influence of ether by Mr. Jackson, house surgeon, and the leg flexed on thigh, and thigh on abdomen, I endeavoured to reduce the dislocation, but found it necessary to enlarge the wound upwards on the fibula. The protruded bones and soft parts having been well washed with a solution of carbolic acid, reduction was easily effected, and the limb placed in suitable splints, the wound closed and dressed antiseptically; there was considerable tension of the limb in this case, also necessitating free incisions. The patient made an uninterrupted recovery, and the wound healed rapidly, and in three months the patient was able to put his foot under him and move about the ward, and very shortly afterwards was able to leave hospital and resume his work, having a perfect foot.

"8 Castle Dawson-avenue, Williamstown.
"*December*, 1889.

"I can walk, and run, and work as well with my left foot, injured in June, 1888, as ever I did, and am not one bit lame.

"Thomas Smith."

[These patients were exhibited at the meetings of the Surgical Section of the Royal Academy of Medicine.]

Sir A. Cooper, who devoted more time to this subject than any other surgeon, has collected some very valuable information on the subject of compound dislocation of the ankle.

"Having endeavoured," says Sir A. Cooper, "to explain what has fallen under my own observation and what I have been able to learn from others upon this difficult subject, I beg leave to express a hope that any of my friends who may have had cases under their care which would throw further light upon this subject will have the kindness to communicate them to me, whether they make for or against the advice I have given, *videlicet*, 'that amputation is not generally necessary in compound dislocation of the ankle,' as I have no further wish but that all the points respecting this severe accident may be fully elucidated and established."

Reviewing the history of the treatment of compound luxations of the ankle-joint, I find that Hippocrates removed the ends of the leg-bones for compound dislocation; but it was not until the end of the last century that the practice became generally recognised. During the interval the limbs of patients suffering from these accidents were invariably sacrificed. The honour, however, of introducing this great improvement (the preservative surgery of the foot) into surgery is undoubtedly due to Mr. Hey, of Leeds, who in the year 1776 sawed off the end of the tibia of a man who had been tossed by a bull and sustained compound luxation of the right ankle. The patient recovered and had a useful foot. Mr. Hey was strongly in favour of trying to save the limb in compound luxations of the ankle. In 1767 Gooch removed the tarsal extremity of the tibia with success, and cases are also recorded by White, of Manchester, in 1770, and by Servius in 1778. In 1782 the elder Moreau, nineteen days after compound luxation, sawed off the articular end of the tibia; the patient recovered completely, with the use of the new joint. The operation then remained in abeyance until 1799, when it was again performed by Hey.

Roux gives much praise to English surgeons for the judicious boldness which they have evinced in the treatment of compound luxations of the ankle-joint, by reduction and removal of the ends of the bones when necessary. Roux acknowledges that the bold

practice of sawing off the ends of the bones in compound luxations of the ankle originated with and was first executed by English surgeons. It is evident, therefore, that Sir A. Cooper was not the first surgeon to recommend saving the limb in cases of compound luxation of the ankle; yet he deserves much credit for having collected such a number of cases of this injury, and also for having taken such a decided stand on the side of preservative surgery.

Hancock, in his beautiful work on the anatomy and surgery of the human foot, says, "I will pass on to those alarming accidents in which, through accident, the joint of the ankle is laid open and its internal economy exposed. Here I shall have the opportunity of relating some of the most brilliant achievements of modern surgery;" and referring to the course of practice to be adopted in such serious accidents, the same distinguished writer says, "*No general precepts can guide the surgeon in this delicate question; genius alone cannot do it; the opportunities of making observations and the talent of profiting by them are here the things which make the consummate surgeon.*"

Ashurst says, "Compound dislocations of the ankle are accidents of extreme gravity, as is well shown by the number of fatal cases which are on record. In deciding upon the course of treatment we are to be guided to a certain extent by the age of the patient; it is the danger to life, rather than the question of usefulness, which must chiefly guide us in determining what course to pursue. As to pure conservatism, the majority of cases in which simple reduction has been practised have resulted disastrously, with suppuration and caries, leading to pyæmia; hence the precept that primary amputation or excision should be performed. The *perfection of antiseptic surgery* has, however, raised anew the question of conservative treatment."

Agnew says, "At one time amputation was deemed the only proper measure in a case of this nature; a larger experience, however, has shown that in most cases of this injury a more conservative course may be adopted with a reasonable prospect of saving the limb."

Erichsen says, "The treatment of compound dislocation of the

ankle-joint must depend to a considerable extent upon the laceration of the soft parts and the condition of the bones forming the joint. If the wound to the soft parts be moderate in extent—clean cut and little bruising and injury to the bones—an attempt should be made to save the limb. This is to be done by the *assiduous use of antiseptics.* In many instances the patients will recover with a stiff but useful limb, the joint being only partially anchylosed; if, however, the bones be projecting and comminuted, and the soft parts extensively lacerated, the question of amputation will necessarily arise." Mr. Erichsen adds, "I believe that the disinclination on the part of the surgeon to amputate in these cases is greatly owing to the strong expression of opinion by Sir A. Cooper, in favour of the attempt to save the limb, having, in many cases, been carried to such an extent as seriously to add to the patient's danger. Secondary amputation may be necessary in consequence of gangrene, erysipelas, or extensive suppuration."

That accomplished surgeon and anatomist Sir William Fergusson says, "In the example here represented" (he pictures a case of compound luxation of the ankle-joint where the tibia and fibula were thrown over on the neck of the astragalus) "I amputated the foot. The operation was not successful, and the practice may seem very questionable." Sir William adds, "Whether the patient would have had a better chance of life with his foot on, it is impossible to say, but it would appear that under any circumstances *amputation in cases of the kind is far from being successful.*" Fergusson then quotes from the *Medical Journal* for August, 1854, and says, "It has been stated by Syme that out of thirteen amputations performed in the Royal Infirmary for compound luxations of the ankle only two recovered, an amount of mortality which may well incline the surgeon to act upon the doctrines inculcated by Sir A. Cooper."

Percival Pott, in referring to compound luxation of the ankle, says, "These cases not infrequently end in fatal gangrene unless prevented by timely amputation, though," he adds, "I have several times seen such cases do well without."

Bryant says, "The treatment of compound dislocation of the

ankle-joint cannot be reduced by any definite rules. Each case must be treated on its own merits. When a small wound exists operative interference is only exceptionally needed, but when a large one, with projection of the bones, it is a question whether the better practice lies in the reduction of the dislocation after cleansing the projecting bones, or in their resection. When the bones cannot be reduced by ordinary force it becomes a necessity; when the bones are much crushed their resection should always be undertaken; indeed, it is a general feeling in my own mind that in compound dislocation, as in compound fractures with a large wound, it is wiser to reseet the ends of the projecting bones than to reduce them. Amputation of the foot should only be performed when the soft parts are much injured, and the age of the patient or his power forbids the hope of recovery with a useful limb being secured."

The late Mr. Stapleton, of Dublin, records, in the *Dublin Hospital Gazette*, a case of compound luxation of the ankle-joint in which the tibia protruded and the internal malleolus was broken off; the fibula was fractured in two places. The case terminated most favourably. There was little or no suppuration. Mr. Stapleton attributes the rapid recovery in a great measure to the very abstemious habits of the patient.

It is very remarkable that Sir A. Cooper makes no allusion to the swelling and tension of the limb in cases of compound luxation of the ankle-joint, nor does he refer to the *urgent need of free incisions.* The same applies to other surgical writers. *In all of my cases incisions were urgently needed.*

Three courses are thus open to the surgeon in cases of compound dislocations of the ankle-joint, *videlicet*—(1) reduction; (2) sawing off the ends of the bone, and then reduction; (3) amputation.

Reasons for Excising Ends of Bone.

1. Where the ends of the bones are deprived of periosteum, and owing to difficulty in effecting reduction.

2. If the fracture at the end of the tibia is oblique, which would prevent the fractured portion from remaining on the astragalus.

3. To relieve spasm of the muscles.

4. To diminish local irritation and hasten cure.

Cases in which amputation may be necessary either to save Life or to prevent the Patient being doomed to Crutches.

1. Advanced age.

2. Very extensive wounds caused by machinery, or extensive contusion of the soft parts by a heavy-laden carriage passing over the limb.

3. Shattered bones of ankle and fractured astragalus and os calcis.

4. Severe hæmorrhage, caused by wounds of tibial arteries and veins.

5. Threatened mortification of foot.

Practical Conclusions.

1. In compound luxations of the ankle-joint there is usually also fracture of one or both malleoli, with laceration of the ligaments.

2. If the end of the protruded bones are fractured obliquely, or spiculated, or covered with sand or dirt, or the periosteum detached, the end or ends of the bones should be resected.

3. To effect reduction the patient should be placed under the influence of an anæsthetic.

4. Flexion of leg on thigh and thigh on pelvis should *always be adopted*, to relax the muscles and facilitate reduction.

5. If necessary the wound should be enlarged to facilitate reduction, with or without excision of the ends of the bones.

6. Antiseptic dressings should invariably be used.

7. Drainage-tubes should be inserted, to facilitate discharge.

8. Suitable splints should be adjusted, and tight bandaging avoided.

9. Opium or chloral with bromide should be administered to quiet the nervous system, especially in persons addicted to strong drink.

10. The diet should be light and unstimulating.

11. If tension of the limb sets in (which occurred in each of my cases), as indicated by swelling and formation of bullæ, free incisions should be made from the ankle to the knee, to relieve

tension, to give exit to serous and purulent fluids, and prevent gangrene.

12. If purulent discharge continues for a long time from the ankle-joint loose pieces of bone may come away or require removal.

13. Experience shows that limbs doomed to primary amputation have ultimately recovered perfectly.

14. If amputation should be necessary, secondary amputation is much more successful than primary.

15. These cases are not suitable for Syme's operation at the ankle-joint, as gangrene is almost sure to set in, owing to the lacerated and contused state of the soft parts. Amputation, if performed, should be done through the lower third of the leg.

44 *Cases of Compound Dislocation of the Ankle-joint, none of which were Amputated—all Recovered.*

—	Sex	Age	Nature of Displacement	Treatment	Result as to Use of Foot, &c.	Name of Surgeon	Observations
1	M	—	Tibia	Reduction	Recovery. Useful foot	—	Amputation advised. Patient and friends refused. Another surgeon put in charge.
2	M	32 yrs.	Tibia and part of astragalus inwards	Reduction. Astragalus excised	,,	Mr. Lynn	None.
3	M	Adult	Tibia inwards	Tibia reduced	,, (stiff ankle)	Mr. Battley	Patient at work in 9 months. Foot good as ever. Case seen by Sir A. Cooper at end of 3 years.
4	F	48 yrs.	Tibia inwards. Fibula fractured	Tibia reduced	Recovery. Useful foot	Mr. Richards	Patient walked without stick.
5	F	Adult	Fibula *outwards*. Tibia fractured	Reduction	,,	Mr. Rowley, St. Thomas' Hospital	Patient walked in 4 months.
6	M	22 yrs.	Tibia inwards 2 inches. Fibula badly fractured	,,	,,	Mr. Clarke	Patient wrote to Sir A. Cooper 4 years after the accident saying he could walk 3 or 4 miles easily, or 8 if required. Would not exchange his leg for a wooden one for the whole of Europe.
7	—	—	Tibia inwards	,,	,,	Mr. Somerville, Stafford Infirmary	
8	—	—	,, ,,	,,	,,	,,	
9	M	38 yrs.	Tibia and fibula *outwards*. Astragalus inwards	,,	,,	Mr Scarr	Patient convalescent in 25 weeks. Foot very useful in a year. This patient was sent to London and seen by Sir A. Cooper, who had thus an opportunity of witnessing the happy result of Mr. Scarr's skill and judgment.
10	M	72 yrs.	Tibia inwards, also fractured Four inches protruding, covered with sand. Joint filled with sand and blood	,,	,,	Mr. Abbott, Needham Market	Patient a butcher; corpulent, intemperate, gouty from youth. Amputation proposed. Patient refused. Walked well in a year. Lived 10 years, and walked as well as ever.
11	F	45 yrs.	Tibia inwards. Fibula protruded. Cavity of joint opened	Portion of bone removed. Reduction	,,	Mr. Rawson, Manchester	Perfect recovery.
12	M	36 yrs.	Tibia inwards	Reduction	,, (stiff ankle)	Mr. Chandler, Kent Co. Hospital	
13	M	—	Tibia	Not reduced	Recovery. Useful foot	Mr. Wickham	Case neglected before Mr. Wickham saw patient. Got well ultimately.
14	M	60 yrs.	Tibia inwards	Reduced	,,	Mr. Fiske	
15	M	Adult	Tibia *forwards*. Fibula fractured	Reduction	,,	Mr. Maddock	Case most unfavourable on account of extensive laceration of ligaments and tendons.
16	M	Youth	Tibia and fibula *outwards*	,,	,,	,,	Loose portions of fibula removed; abscesses formed up leg. Recovery.
17	M	,,	,, ,, ,,	,,	,,	,,	

44 *Cases of Compound Dislocation of the Ankle-joint, none of which were Amputated—all Recovered.*

—	Sex	Age	Nature of Displacement	Treatment	Result as to Use of Foot, &c.	Name of Surgeon	Observations
18	M	13 yrs.	Tibia and fibula outwards 4 inches. Astragalus loose and torn from its connecting ligaments. (Machinery accident.)	Reduction	Recovery. Useful foot	Mr. Ormond	Amputation postponed in this very bad case on account of the shock. Severe inflammation extended up thigh. Operation *again* postponed. Extensive sloughing took place. Four inches of end of fibula exposed. In 15 weeks the boy walked half-a-mile with the aid of crutches, and soon laid his foot flat on the ground and walked without the aid of a stick. Mr. Ormond sent Sir A Cooper a piece of this boy's tibia which exfoliated, and Mr. Ormond says he does not claim the merit of saving the boy's foot, as he merely postponed the amputation on account of shock and subsequent inflammation.
19	M	13 yrs.	*Tibia and fibula outwards*	Ends of tibia and fibula excised. Reduction	,,	Sir A. Cooper, Guy's Hospital	This boy was able to bear on his foot in 4 months; walked well. Sir A Cooper, who was urged to amputate this boy's foot, said he could not doom the lad to a life of mendicity, and determined to try and save the limb He had the inconceivable pleasure of seeing this boy, in 4 months, walk before the students from one end of the ward to the other.
20	M	40 yrs	Tibia inwards. Integuments nipped into joint. Foot loose	End of tibia excised. Reduction	,,	,,	
21	M	38 yrs.	Tibia inwards. Fibula fractured	End of tibia excised. Reduction	,,	Mr. Forster, Gny's Hospital	
22	M	40 yrs.	Tibia and fibula outwards. Astragalus fractured Superior half of astragalus attached to the bones of the leg, also oblique fracture of upper part of femur.	Reduction	,,	Mr. Rumsey, Aversham	Amputation not done on account of the complication of fractured femur.
23	M	Adult	Tibia and fibula inwards. End of fibula fractured	1½ inches of bone excised. Reduction	,,	Mr. Hicks	
24	M	36 yrs.	Tibia and fibula outwards. End of fibula fractured longitudinally for 3 inches	Ends of bone excised. Reduction	,,	Mr. Cooper, Bradford	Sir A. Cooper saw this man 2 years after the accident. He could go up and down a ladder, and followed his business as a painter as well as ever.
25	M	15 yrs.	Tibia. Anterior tibial artery wounded.	End of tibia excised. Reduction. Anterior tibial artery tied	,,	Mr. Sandford, Worcester Infirmary	
26	M	Adult	Tibia inwards	End of tibia excised	,,	Dr. Lynn, R.N., "Walmer Castle," East Indiaman	
27	F	72 yrs.	Tibia inwards. Fibula fractured	Reduction	,,	Mr. Needham, Leicester Infirmary	
28	M	18 yrs.	Tibia inwards. External malleo-	End of fibula ex-		Sir A. Cooper, Guy's	

			navicularc. Fibula fractured 2 inches above malleolus				joint under his care, and the results of his observation have been that in such cases there is not only a chance of saving the limb, but of that limb being at a future time useful. Mr. Hammicle relates a case in which the lower end of the tibia became carious, and after 18 months 3 inches of the bone came away.
30	M	14 yrs	Tibia and fibula outwards. Ends of malleoli fractured	,,	,,	Mr. Bryant, Guy's Hospital	
31	M	—	Tibia projected	End of bone removed	,,	Mr. Bickersteth, Liverpool Royal Infirmary	
32	M	1 yr. & 9 ms.	Tibia forwards. Anterior tibial artery wounded	Reduction	,,	Mr. Budd and Mr. Waldron, Worcester Infirmary	
33	M	38 yrs	Tibia inwards	End of tibia resected. Reduction	,,	,,	
34	M	32 yrs.	Tibia and fibula forwards	Reduction	,,	Mr. Greenhow, Leeds	In 2 months wound healed and patient moved about on crutches.
35	F	10 yrs.	Tibia and fibula outwards. Foot turned upwards at right angles	Ends of bones resected 1 *inch*, to facilitate reduction	,,	Mr. Garraway	Enough of tibia and fibula removed to prevent contact with the astragalus, thus saving the ankle-joint.
36	M	8 yrs.	Ankle-joint completely opened from accident	Reduction	,,	Mr. Wheelhouse	Amputation agreed upon. Boy placed on table. Decided then to give him a chance on account of his age. Perfect recovery.
37	F	—	Tibia and fibula projecting. Foot inverted to a right angle Joint completely opened	,,	,,	Mr. Thompson, of Launceston	Portion of dead bone came away. Patient walked briskly.
38	M	Adult	Tibia inwards 4 inches. Fibula fractured	End of fibula resected. Reduction	,,	Mr. Parrott, Enfield	Two years after accident patient could dig; foot as strong as before the accident.
39	—	—	Tibia and fibula	Ends of bones resected. Reduction	,,	Gooch	
40	M	30 yrs	Fibula 2 inches. End comminuted. Tibia fractured at malleolus	End of bone resected	,,	Lister	In 6 weeks the fracture of the tibia united, and the patient could move the ankle-joint.
41	M	Adult	Tibia inwards. Fibula fractured in two places	Reduction	,,	Mr. Stapleton	Little or no suppuration; patient abstemious.
42	M	Adult (*private patient*)	Tibia and fibula forwards projecting on dorsum of foot. Machinery accident, tendons torn. Whole front of joint opened	,,	,,	Henry Croly, M.D., F.R.C.S., J P., Co. Dublin, Rathfarnham, and Mr. Croly	This patient, a farmer, had diffuse inflammation of leg, requiring free incisions. Case under treatment about 9 months; recovered with useful foot.
43	M	48 yrs.	Tibia inwards 4 inches. Fibula comminuted. End of tibia fractured. Several portions of bone extracted. Admitted to Hospital, May 29th, 1888	Reduction under ether	,,	Mr. Croly, City of Dublin Hospital	Patient, coal porter; hard drinker. Inflammation of leg followed from tearing and infiltration of the muscles. Free incisions made up the leg. Several small portions of fibula came away, also articulating end of tibia, 6 months after accident. Foot firm. Patient still under treatment.
44	M	28 yrs.	Tibia and fibula *outwards*, torn completely from ligaments Foot completely *inverted*. Inner side almost touching side of calf of leg	Wound enlarged. Reduction under ether	,,	Mr. Croly, City of Dublin Hospital	This patient never tasted whisky. Naturally strong young man Made a rapid recovery. Walked up and down ward before students in 3 months. I exhibited him at the opening meeting of the Surgical Section of the Royal Academy of Medicine, Nov, 1888.

10 *Cases (with 5 Deaths) of Compound Luxation of the Ankle-joint, in which Amputation was performed, or where Death occurred without Operation.*

—	Sex	Age	Nature of Displacement	Treatment	Result	Name of Surgeon	Observations
1	M	Adult	Tibia inwards. Extensive laceration of soft parts. Severe hæmorrhage	Amputation	Recovery	Sir A. Cooper	
2	M	36 yrs.	Tibia inwards. Machinery accident	,,	,,	,,	Operation 7 weeks after accident.
3	F	34 yrs.	Tibia and fibula outwards. Caused by jumping from a window. Astragalus protruded	,,	,,	,,	Operation on 16th day.
4	M	48 yrs	Tibia and fibula outwards. Caused by wheel of a cart. Os calcis also fractured	,,	,,	,,	
5	M	Adult	Tibia inwards. Astragalus dislocated	Tibia reduced. Astragalus removed. Foot amputated in 2 years	,,	Mr. Norman, Bath	
6	M	,,	Tibia inwards. Fibula fractured	Reduction	Death	Sir A. Cooper	Died 8th day. Septicæmia.
7	M	—	Tibia and fibula forwards	Amputation	,,	Sir Wm. Fergusson	Sir William Fergusson says: "Whether the patient would have had better chance of life with his foot on it is impossible to say, but it would appear, under any circumstances, amputation in cases of the kind is far from being successful."
8	M	Adult	Tibia and fibula forwards. No fracture	,,	,,	—	
9	M	,,	Tibia inwards	,,	,,	Recorded by Chelius	In this case bones were reduced, soft parts sloughed, patient became delirious, and during violent efforts the bones were thrust through the mortified skin
10	M	Old Man	Tibia and fibula forward	,,	,,	Mr. Croly, City of Dublin Hospital.	Amputation of leg—death from shock.